VIRAL HEMORRHAGIC FEVERS

FILOVIRUSES

Filoviruses belong to a virus family called Filoviridae and can cause severe hemorrhagic fever in humans and nonhuman primates. So far, only two members of this virus family have been identified: Marburg virus and Ebola virus. Four subtypes of Ebola virus have been identified: Ivory Coast, Sudan, Zaire and Reston. The Reston subtype is the only known filovirus that does not cause severe disease in humans; however, it can be fatal in monkeys.

The first filovirus was recognized in 1967 when a number of laboratory workers in Germany and Yugoslavia, who were handling tissues from green monkeys, developed hemorrhagic fever. A total of 31 cases and seven deaths were associated with these outbreaks. The virus was named after Marburg, Germany, the site of one of the outbreaks.

After the initial outbreaks, the virus disappeared and did not reemerge until 1975, when a traveler, most likely exposed in Zimbabwe, became ill in Johannesburg, South Africa. The virus was transmitted there to his traveling companion and a nurse. A few sporadic cases of Marburg hemorrhagic fever have been identified since that time.

Ebola virus was first identified in 1976 when two outbreaks of Ebola hemorrhagic fever (Ebola HF) occurred in northern Zaire (now the Democratic Republic of Congo) and southern Sudan. The outbreaks involved what eventually proved to be two different subtypes of Ebola virus; both were named after the nations in which they were discovered. Both viruses showed themselves to be highly lethal, as 90 percent of the Zairian cases and 50 percent of the Sudanese cases resulted in death.

In 1989, a new Ebola virus subtype was identified in imported cynomolgous macaques (an Asiatic monkey, Macacca fascicularis) during an outbreak in a primate quarantine facility in the United States. This subtype causes severe illness in primates, but it did not appear to cause illness in the few humans infected. Another subtype, named Ivory Coast, was identified in a patient infected in that country in 1994. This incident provided the first evidence of Ebola virus infection in West Africa.

Between 1976 and 1995, Ebola virus appeared sporadically in Africa, with small to mid-sized outbreaks confirmed between 1976 and 1979. In 1995, a large epidemic of Ebola HF occurred in Kikwit, Zaire. Of the 316 people known to have contracted the disease, 80 percent died. Smaller outbreaks were identified in Gabon between 1994 and 1996.

It appears that filoviruses are zoonotic, that is, transmitted to humans from ongoing life cycles in animals other than humans. Despite numerous attempts to locate the natural reservoir or reservoirs of Ebola and Marburg viruses, their origins remain undetermined. However, because the virus can be replicated in some species of bats, some types of bats native to the areas where the virus is found may prove to be the viruses' carriers.

In an outbreak or isolated case among humans, just how the virus is transmitted from the natural reservoir to a human is unknown. Once a human is infected, however, person-to-person transmission is the means by which further infections occur. Specifically, transmission involves close personal contact between an infected individual or their body fluids and another person. During recorded outbreaks of hemorrhagic fever caused by filovirus infection, people who cared for (fed, washed, medicated) or worked very closely with infected individuals were especially at risk of becoming infected themselves. Nosocomial (hospital) transmission through contact with infected body fluids – via reuse of unsterilized syringes, needles or other medical equipment contaminated with these fluids – also has been an important factor in the spread of disease. When close contact between uninfected and infected people is minimized, the number of new filovirus infections in humans usually declines. In the laboratory, the viruses display some capability of infection through small-particle aerosols; however, airborne spread among humans has not been clearly demonstrated.

Viral hemorrhagic fevers caused by viruses in the filovirus family include Ebola hemorrhagic fever and Marburg hemorrhagic fever.

For more information, call the North Dakota Department of Health at 701.328.2378.